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Engaging End-users to Inform the Development of the Global Standard for the Identification of Key Biodiversity Areas

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Abstract

We report results from an end-user engagement process, convened by the International Union for Conservation of Nature (IUCN), which informed the development of the Global Standard for the Identification of Key Biodiversity Areas. Key Biodiversity Areas are sites contributing significantly to the global persistence of biodiversity. We used a mixed methods approach involving interviews and an online questionnaire with end-users to determine their needs and concerns in relation to the Key Biodiversity Area approach. We found a remarkable level of convergence in end-user opinion on 12 important topics. Four topics resulted in a divergence in end-user opinion requiring further dialogue and consideration, including: (i) the value of a global standard compared to various national approaches; (ii) the prioritisation of Key Biodiversity Areas over other areas; (iii) whether Key Biodiversity Area data should be made freely available; and (iv) whether or not development activities should be permitted in Key Biodiversity Areas. Our results informed the development of the Global Standard for the Identification of Key Biodiversity Areas and a new governance structure, the Key Biodiversity Area Consultative Forum, which provides a mechanism for ongoing dialogue with end-users. We conclude by sharing five good practice recommendations for future end-user engagement processes.

Keywords: end-user engagement; knowledge production; biodiversity; Key Biodiversity Areas.

Highlights

- End-user input informed the development of a new global conservation standard.
- Revealed remarkable convergence in end-user opinion on many topics.
- End-user opinions diverged on scale, cost, prioritisation, and development activities.
- Stimulated the establishment of the KBA Consultative Forum for sustained engagement.
- Five good practice recommendations proposed for successful end-user engagement.

1. Introduction

Development of strategies to understand and address global environmental challenges, including biodiversity loss, requires the production, transfer, exchange, and use of knowledge between scientists, policy makers, practitioners, and the wider public (Fazey *et al.* 2013; Graham *et al.* 2006; Jolibert and Wesselink, 2012). Engagement with end-users to understand their needs is an important component of global knowledge production processes as it provides insight into how, and even whether, the resultant knowledge may be used and by whom.

The demand for applied and impactful research and decision support tools is increasing (Matthies *et al.* 2007; Reed *et al.* 2014; Shove and Rip, 2000). The growing expectation, and at the same time challenge, for knowledge producers is to develop user-inspired and user-meaningful knowledge collaboratively (Raymond *et al.* 2010). In response to this, end-users are increasingly being engaged in knowledge production processes, resulting in changes in the way that knowledge producers, end-users, and other stakeholders interact (Contandriopoulos *et al.* 2010). End-user engagement processes have been used in various disciplines, sectors, and geographies; however, empirical analyses of global scale end-user engagement processes, specifically those related to global transdisciplinary knowledge production, remain relatively scarce (Garard and Kowarsch, 2017; Hulme, 2010; Montana, 2017; Shove and Rip, 2000; Turnhout *et al.* 2016).

Biodiversity conservation is often referred to as a transdisciplinary field because it incorporates a plurality of perspectives and motivations (Mace, 2014; Wilson, 1999) to inform decision-making in policy and practice (Hadorn *et al.* 2006; Pruitt and Waddell, 2005; Tress *et al.* 2005). The International Union for Conservation of Nature (IUCN) is a global environmental network with a transdisciplinary governance structure and a membership that consists of members from government, civil society, indigenous communities, business, and academia (Holdgate, 1999). IUCN is known for co-developing biodiversity and conservation knowledge products by bringing together stakeholders with diverse perspectives and motivations (Brooks *et al.* 2015; Stuart *et al.* 2017). The development and maintenance of these knowledge products requires considerable resources, as documented in Juffe-Bignoli *et al.* (2016).

A Global Standard for the Identification of Key Biodiversity Areas (hereafter referred to as the KBA Standard) (IUCN, 2016), and the World Database of Key Biodiversity Areas, are examples of a standard and a decision support tool drawn from the knowledge of experts, end-users, and additional stakeholders. KBAs are defined as “sites contributing significantly to the global persistence

of biodiversity” (IUCN, 2016: 9). The World Database of Key Biodiversity Areas¹ hosts data on KBAs of global and regional significance (BirdLife, 2018). The KBA Standard provides the methodology (definitions, criteria, thresholds, and delineation procedures) to identify KBAs (IUCN, 2016). The KBA Standard builds upon over 30 years of experience in identifying areas of importance for the different taxonomic, ecological, and thematic subsets of biodiversity and aims to provide a methodology to consolidate and harmonise these existing approaches (Bennun *et al.* 2007; Eken *et al.* 2004; Foster *et al.* 2012; IUCN, 2016; Knight *et al.* 2007; Langhammer *et al.* 2007). **Table 1** provides an overview of the approaches that the KBA Standard aims to consolidate and harmonise.

Table 1. Site-level approaches to identifying, designating, and safeguarding areas of importance for biodiversity.

Approach	Organisation/Institution	Year of Establishment	Key Reference
Identification Approaches			
Important Bird and Biodiversity Areas	BirdLife International	1979	Osieck and Mörzer-Bruyns, 1981 Donald <i>et al.</i> (in press)
B-ranked sites (USA)	The Nature Conservancy	1970s	TNC, 2001
Important Plant Areas	Plantlife International	2001	Palmer and Smart, 2001 Anderson, 2002
Important Fungus Areas (UK)	Plantlife International, Association of British Fungus Group and the British Mycological Society	2001	Evans <i>et al.</i> , 2001
Alliance for Zero Extinction Sites	Alliance for Zero Extinction	2005	Ricketts <i>et al.</i> 2005
Important Freshwater Biodiversity Areas	IUCN Freshwater Programme	2005	Darwall and Vie, 2005
Prime Butterfly Areas (EU)	Butterfly Conservation Europe	2006	van Swaay and Warren, 2006
Designation Approaches			
Ramsar Wetlands	Ramsar Convention	1971	Ramsar Convention Secretariat, 2016
Natural World Heritage Sites	World Heritage Convention	1972	UNESCO, 1972
Special Protection Areas (SPAs), Natura 2000, Special Areas of Conservation (SAC) (EU)	European Commission	1979; 1992	Birds Directive, 1979 (updated 2009) Habitats Directive, 1992
Emerald Network of Areas of Special Conservation Interest (EU)	Council of Europe	1989	Bern Convention, 1982
Ecologically and Biologically Significant Areas	United Nations Convention on Biological Diversity	2008	Weaver and Johnson, 2012
Private Sector Safeguard Policies and International Sustainability Standards			
High Conservation Value Areas	Forest Stewardship Council and Proforest	1999	Jennings, 2004

¹ <http://www.keybiodiversityareas.org>

IFC Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources	International Finance Corporation	2012	IFC, 2012
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85

86 It is difficult to trace the exact time at which, and processes through which, the KBA concept gained
87 wider international recognition; however, the first indication of a growing awareness and diffusion
88 of the concept appears to be a side event during the Convention on Biological Diversity (CBD)
89 Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA9) in 2003 that was hosted
90 by BirdLife International, Conservation International, and PlantLife International. There were also
91 KBA concept workshops held during the IUCN World Parks Congress (WPC) in 2003 and a KBA criteria
92 development workshop, supported by the MacArthur Foundation in 2004 (Eken *et al.* 2004). Eken *et*
93 *al.* (2004) present an early iteration of the KBA criteria, which were based upon the concepts of
94 irreplaceability and vulnerability², and they also proposed provisional KBA thresholds.

95 During the 2004 World Conservation Congress (WCC) the IUCN membership negotiated Resolution
96 3.013 on the uses of the IUCN Red List of Threatened Species and requested that the Species Survival
97 Commission (SCC) work in partnership with IUCN members to:

98 *“...convene a worldwide consultative process to agree a methodology to enable countries*
99 *to identify Key Biodiversity Areas, drawing on data from the IUCN Red List of Threatened*
100 *Species and other datasets, building on existing approaches and paying particular attention*
101 *to the need to: (i) enlarge the number of taxonomic groups used for site-based priority-*
102 *setting approaches; (ii) have quantitative, transparent and objective criteria to identify Key*
103 *Biodiversity Areas; and (iii) report on progress towards achieving this objective at the 4th*
104 *IUCN World Conservation Congress.”*

105 IUCN (2005: 16 – emphasis added)

106 This WCC Resolution 3.013 marked the beginning of the global stakeholder engagement process that
107 informed the development of the KBA Standard.

108 Langhammer *et al.* (2007) then expanded upon the initial criteria and thresholds developed by Eken
109 *et al.* (2004), provided additional guidelines on the identification and delineation of KBAs and
110 presented an extensive review of KBA related literature and applications.

² Margules and Pressey (2000) provided a pivotal review of global conservation planning strategies and suggest a conceptual framework for the measure of biodiversity irreplaceability and vulnerability. The spatial rarity of biodiversity features can be measured as irreplaceability and the degree of threat can be measured as vulnerability.

111 In 2007 there was a debate in the KBA literature wherein Knight *et al.* (2007) critiqued the KBA
112 approach, identified five limitations, and suggested three practical modifications and Bennun *et al.*
113 (2007) provided responses to these recommendations to clarify the KBA approach. Of particular
114 relevance to this research is the recommendation that the KBA Standard should not be developed
115 and implemented in a top-down way and should instead aim to engage stakeholders using a bottom-
116 up approach (Knight *et al.*, 2007). At the time of this exchange there was no internationally
117 recognised standardised approach for identifying KBAs, as the KBA Standard was still in its inception
118 phase; however, this debate, and others that have taken place throughout the development of the
119 KBA Standard, provided important input that informed the global stakeholder engagement process
120 and the evolution of the KBA approach.

121 The IUCN, under the leadership of its Species Survival Commission (SSC) and the World Commission
122 on Protected Areas (WCPA), convened a multi-year (2004 – 2016) global stakeholder engagement
123 process to inform the development of the KBA Standard. This process included four main activities:
124 (i) technical workshops with subject experts; (ii) regional stakeholder engagement events; (iii) two
125 rounds of online consultation on drafts of the KBA Standard; and (iv) end-user interviews and an
126 online end-user questionnaire. Here, we examine the outcomes of the fourth of these, the end-user
127 engagement component of the global stakeholder engagement process.

128 The different ways and contexts in which knowledge related to KBAs might be used were considered
129 during the first technical KBA workshop (IUCN, 2012) and the outcomes of this workshop acted as a
130 driver for the design and implementation of the end-user engagement process. For this research, we
131 defined end-users as those who will use KBA data to inform their decision-making processes (IUCN,
132 2012). Here, we explore end-users' needs and concerns using a mixed methods approach to
133 understand how the end-user engagement process informed the development of the KBA Standard.
134 We conclude by sharing five good practice recommendations for future end-user engagement
135 processes.

136 **2. Research design and methods**

137 This transdisciplinary research was problem-oriented and reached across different disciplines,
138 concepts, and methods to inform practice (Klein, 2004; Robinson, 2008). We used semi-structured
139 interviews complemented by a quantitative questionnaire for the following reasons: (i) the
140 qualitative data were used to determine the most important topics and the quantitative
141 questionnaire data were used to quantify perspectives on these topics; (ii) the combined qualitative
142 and quantitative data enhanced the comprehensiveness and validity of the findings; and (iii) the
143 qualitative data provided detailed contextual understanding and the quantitative data provided

broader generalisable findings (Brannen, 2005; Bryman, 2008; Johnson and Onwuegbuzie, 2004). The purpose of our combined use of end-user interviews and the online questionnaire engaging end-users was to seek, document, and consider end-users' needs and concerns to inform the development of the KBA Standard. We did not aim to reach consensus on any specific topics.

2.1 Qualitative interviews

We conducted semi-structured end-user interviews and focus groups between 2012 – 2014 with representatives from intergovernmental agencies, private sector, national and regional government agencies, and civil society. A typology of end-user groups to target for the interviews was developed through deliberation during the first technical workshop (IUCN, 2012). We interviewed 45 end-users; however, as some end-user opinions were solicited in focus groups, this resulted in a total of 24 interviews. The end-user groups interviewed are described in **Table 2**, including sector specific categories and organisations.

Table 2. End-user interview details (see Dudley *et al.* (2014) for further information).

#	End-user Sector Category / Organisation	Number of end-users interviewed
Civil Society		
1	BirdLife International	2
2	The Nature Conservancy (TNC)	1
3	Conservation International (CI)	1
4	Bat Conservation International	2
5	Zoological Society of London (ZSL)	2
6	Grupo Jaragua, Dominican Republic	1
7	NatureServe and Natural Heritage Network	2
8	Indigenous Peoples' and Community Conserved Areas (ICCA Consortium)	1
National and Regional Government Agencies		
9	ASEAN Centre for Biodiversity	1
10	Parks & Wildlife Finland	1
11	European Union	5
12	South Pacific Regional Environment Programme (Pacific Region)	2
Private Sector		
13	Oil and Gas	3
14	Mining and Metals	2
15	Commercial Banks	4
16	Food Industry	1
17	High Conservation Value (HCV) Areas	2
Intergovernmental Agencies		
18	Ramsar Convention (Ramsar Sites)	2
19	World Heritage Convention (World Heritage Sites)	2
20	Convention on Biological Diversity (Ecologically and Biologically Significant Areas, EBSAs)	2
21	United Nations Development Programme (UNDP)	1
22	Global Environment Facility (GEF)	1
23	Critical Ecosystem Partnership Fund (CEPF)	1
24	World Bank Group	3
Total		45

158
 159 The interviewees were selected from IUCN’s existing network of collaborators and contacts using a
 160 combination of non-probability sampling techniques: (i) purposive sampling (selected based on
 161 characteristics of the population and the objectives of the research); (ii) convenience sampling
 162 (selected due to convenient accessibility), and (iii) snowball sampling (selected based upon existing
 163 interviewee recommendations). Our interviewees consisted mainly of end-users with an existing
 164 level of engagement with, or knowledge of, the KBA Standard. The interviewees were involved in co-
 165 editing and co-authoring the interview transcripts, which enabled us to gain permission for their
 166 publication in Dudley *et al.* (2014).

167 The open-ended questions presented were the following:

- 168 (i) What do you need from KBAs?
- 169 (ii) What tools and products do you require?
- 170 (iii) How do KBAs fit with your existing and emerging policies and procedures?
- 171 (iv) Do you have any fears/concerns about the application of the KBA Standard? If so, what
 172 are they?
- 173 (v) What are the main recommendations you have for the development of the KBA
 174 Standard?

175 The results from these interviews provided initial insights about end-users’ needs and concerns,
 176 which informed the development of the online questionnaire described below.

177 2.2 Online questionnaire

178 The online questionnaire was developed from the initial analysis of the qualitative interview data
 179 and it was distributed via email through the IUCN network to more than 18,000 potential
 180 respondents. The full questionnaire can be found in the **Supplementary Data A**. The questionnaire
 181 was available for completion during the following periods: September 30th – November 30th 2014 (in
 182 conjunction with the first round of the global online consultation for the first draft of the KBA
 183 Standard); and September 9th – October 11th 2015 (during the second round of the global online
 184 consultation for the second draft of the KBA Standard). The questionnaire was available in the three
 185 official IUCN languages (English, French, and Spanish). 173 respondents from diverse sectors and
 186 regions completed the questionnaire, comprising 75 respondents during the first round and 98
 187 during the second (completion rate of approximately 1%). **Table 3** demonstrates the sector and UN
 188 Region categorisations of the end-user questionnaire respondents.

189 **Table 3.** Sector and UN Region categorisations for end-user questionnaire respondents.

	Western Europe and Others Group (WEOG)	Latin American and Caribbean Group (GRULAC)	Asia- Pacific Group	African Group	Eastern Europe Group	TOTAL
Civil Society	21	17	8	11	7	64

Academia	16	12	12	5	1	46
National and Regional Government	12	6	9	6	0	33
Private Sector	7	6	5	4	1	23
Intergovernmental Agency	5	0	1	1	0	7
TOTAL	61	41	35	27	9	173

The questionnaire entailed 22 questions, of which five were the same open-ended questions posed during the interviews (see **Section 2.2.1**) and 17 that were on a Likert scale. The 17 Likert scale statements were derived from our interpretation of the most prominent areas of convergence and divergence in opinion that emerged from the qualitative data. **Table 4** outlines how the themes that emerged from the qualitative analysis informed the development of the 17 Likert statements. By targeting more respondents, we aimed to broaden the sample size and examine the prevalence of perspectives present in the qualitative data.

Table 4. The interview categories and codes that informed the questionnaire items.

Interview Category	Interview Code	Questionnaire Item
1. Stakeholder engagement	1a. Communication	- Clear communication regarding the added value of the KBA Standard is needed (Q16).
	1b. Local level stakeholder engagement	- Thoughtful engagement at the local level will be essential to the effective application of the KBA Standard (Q15).
2. Existing approaches	2a. Complementary or conflicting approaches?	- A standardised approach to identify KBAs is needed (Q1). - The KBA Standard will encourage collaboration among constituencies involved in identifying sites of particular importance for biodiversity (Q17). - The KBA Standard should build upon the existing approaches used to identify sites of particular importance for biodiversity (such as Important Bird and Biodiversity Areas, Important Plant Areas, Alliance for Zero Extinction Sites and others) (Q2).
3. Issues of scale	3a. Global vs. national	- One global standardised approach for identifying KBAs is preferable to multiple national level approaches that identify areas of particular importance for biodiversity (Q5). - A focus on KBAs may undermine national processes and priorities (Q6).
4. Implementation of the Standard	4a. Data and additional information	- A lack of biodiversity data in many regions could limit the utility of the KBA Standard (Q10). - KBA documentation should include additional information when available (such as information on climate change impacts, ecosystem services and socio-economic data) (Q14).
	4b. Timeliness of the KBA Standard	- An initial KBA database, based on currently available data, should be developed quickly in order to be immediately useful (Q12).
	4c. Resources	- KBA data should be freely available for commercial use (Q9).
5. Informing decision-	5a. Management options	- KBA documentation should include management options for the site (Q13).

making	5b. 'Sustainable use' vs. 'no go'	- Development activities should not be permitted in KBAs (Q11).
	5c. Prioritisation	- KBA data should be used to inform the prioritisation of conservation action (Q3).
		- KBAs themselves should be priorities for conservation action (Q4).
		- An emphasis on KBAs could hinder conservation efforts outside of KBAs (Q8).
		- KBAs should be ranked according to relative importance for biodiversity (Q7).

The questionnaire was structured as follows: optional questions regarding respondent's sector of employment, institution/organisation, nationality, and country of employment were presented first. These were followed by 17 closed-ended five-point scale Likert scale statements (from Strongly Agree to Strongly Disagree). The five open-ended questions from the interviews were then presented at the end of the questionnaire. These questions were also optional.

2.3 Cost of engaging end-users

Designing and implementing meaningful end-user engagement processes requires considerable resources. The end-user engagement component of the broader global multi-stakeholder engagement process that informed the development of the KBA Standard took over five years (2012 – 2017) to design, implement, analyse, and interpret. Here we account for the time and resources used to undertake mixed methods engagement with end-users in order to evaluate the efficiency of this approach and to inform planning for future similar processes. Personnel time (both remunerated and volunteer) and participant time were recorded in terms of working days (one working day being eight hours). **Table 5** illustrates our estimate of the personnel and participant time (258 working days) required to elicit input from end-users to inform the development of the KBA Standard.

Table 5. Estimate of resources used for each component of the end-user engagement process.

Resource Category	Framing Workshop 2012	Interviews 2012-2014	Questionnaire 2014-2015
Personnel time (remunerated and volunteer time of IUCN staff, IUCN commission members, external consultants, and/or researchers)	2	148	72
Participant time (time taken for participants to attend workshops, be interviewed and/or respond to the questionnaire)	5	24	7
Total (working days) = 258	7	172	79

3. Results

3.1 Overview

We received 173 responses to the online questionnaire. There was remarkable convergence of opinion for many items (we defined convergence as questions with an inter-quartile range of one. Five items, however, resulted in a divergence of opinion (we defined divergence as questions with an inter-quartile range of two (see **Supplementary Data B** for the descriptive statistics)). **Figure 1** provides an overview of the 173 responses to the 17 five-point scale closed-ended Likert statements. Items are ordered from higher levels of convergence (top) towards increasing divergence (bottom).

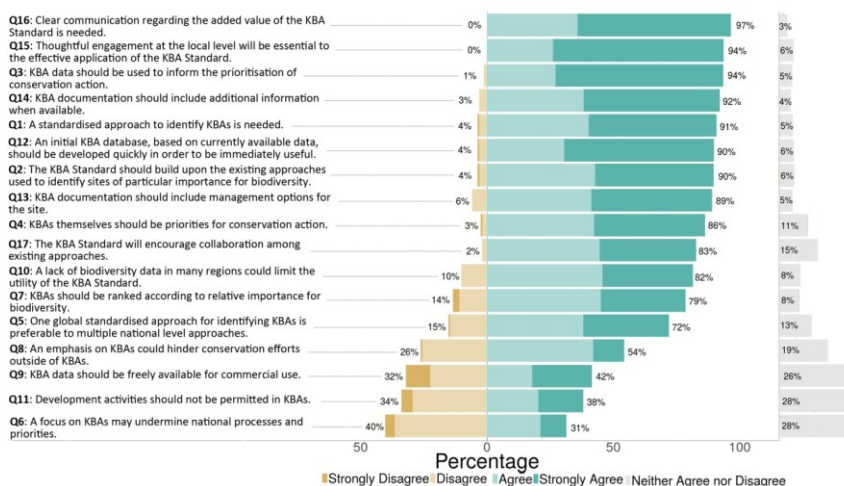


Figure 1. Responses to the Likert statements ordered from higher levels of convergence (top) towards increasing divergence (bottom). Percentages represent aggregates. Strongly disagree and disagree (left), agree and strongly agree (right), and neither agree nor disagree (far right).

As depicted in **Figure 1**, end-users agreed on most items; however, the answers to **Q5**, **Q6**, **Q8**, **Q9**, and **Q11** demonstrated divergence in end-user opinion. The topics of divergence were: (i) the relative value of a global standard compared to varying national approaches (**Q5**, **Q6**); (ii) the prioritisation of KBAs over other areas (**Q8**); (iii) whether KBA data should be made freely available (**Q9**); and (iv) whether development activities should be permitted in KBAs (**Q11**). To further explore this divergence in opinion, we combined the results from the qualitative and quantitative data. The full end-user interviews, from which the qualitative quotes below are derived, can be found in Dudley *et al.* (2014). Quotes from the open-ended questionnaire questions are also included. For simplicity, from this point onwards, ‘disagree’ represents a consolidation of ‘disagree’ and ‘strongly disagree’. Likewise, ‘agree’ is a consolidation of ‘agree’ and ‘strongly agree’. We do not interpret ‘neither agree nor disagree’ responses here; however, this response option allowed us to keep

Commented [RV1]: Would interpret Q5 as slight divergence – there’s still nearly three quarters of respondents who agree, and 13% who are neutral

246 undecided opinions separate from the rest of the data. In this case, as responses become more
247 divergent the number of 'neither agree nor disagree' responses increases, which could be further
248 indication of the challenging nature of these particular topics.

Commented [RV2]: ? – some text missing?

249 3.2 Relative value of a global standard compared to varying national approaches

250 During the interviews, the end-users questioned the difference between sites of global importance
251 and sites of regional/national significance. Many, particularly those involved in natural resource use
252 and land-use decision-making, indicated that they required information about sites of national
253 importance, as well as sites of global importance. Others indicated that they needed guidance on
254 how to bridge global KBA data to local contexts. Concerns were also raised about the global focus
255 KBAs, including whether: (i) global priorities could undermine national priorities; (ii) it could be
256 perceived as a top-down approach; and (iii) this could result in a lack of interest or engagement at
257 the national and/or sub-national level.

258 One end-user stated that:

259

260 *"While [a] global approach is desirable for broad decisions, national KBAs will be useful for*
261 *specifics - because important areas could lose out in global KBAs due to [a] myriad [of]*
262 *challenges (eg: poor data, lack of cohesion among stakeholders locally, interferences from*
263 *powerful groups contributing to biodiversity loss etc.)"*

264

265 Civil society questionnaire respondent

266

267 Conversely, some noted that KBAs could add validation and attention to nationally important sites
268 due to the involvement of international organisations:

269

270 *"...KBAs help to add more weight to particular sites when communicating with environmental*
271 *authorities, particularly with the 'endorsement' provided by the IUCN, as they are not only of*
272 *local importance but also of global importance."*

273

274 Civil society interviewee

275

276 **Q5** and **Q6** were designed to gain additional understanding about these contrasting perspectives.

277 Most questionnaire respondents agreed (72%) that a global approach was preferable, with only 15%
278 disagreeing. Slightly more end-users (40%) believed that a focus on KBAs would not undermine
279 national processes and priorities; but 31% believed that national processes would be undermined.

280

281 3.3 Areas outside KBAs

282 End-users raised concerns regarding the status of areas outside KBAs. Some felt as though a site that
283 is not a KBA would be very difficult to conserve and that an emphasis on KBAs could reduce the
284 attention given to other aspects of conservation.

285

286 *"I think [a] global standard for identification of important sites for biodiversity is necessary.*
287 *However [...] the communication of KBA should not give [the] connotation that areas outside*
288 *KBAs are not biodiversity-significant."*

289

290 Civil society questionnaire respondent

291

292

293 Some end-users were concerned that areas outside KBAs would be viewed as being less important
294 and therefore open to being freely developed:

295

296 *"More guidance is needed on the way in which nature outside KBAs is supposed to be*
297 *viewed: does KBA analysis mean (or can it be interpreted as meaning) that anything outside*
298 *a KBA is open for development?"*

299

300 Intergovernmental agency interviewee

301

302 Conversely, one private sector end-user substantiates this concern by stating that they would use
303 the KBA Standard in order to better understand where development safeguards could be less strictly
304 applied:

305

306 *"This means that the KBA standard must also differentiate significant sites from the rest of*
307 *the landscape where the application of safeguards results in fewer mitigation measures."*

308

309 Private sector interviewee

310

311 This informed the development of **Q8**: *'an emphasis on KBAs could hinder conservation efforts*
312 *outside KBAs'*. More than half of the end-user questionnaire respondents agreed (56%) and fewer
313 disagreed (25%).

314 3.4 Who bears the cost of generating KBA data?

315 The resources needed to develop, implement, manage, and maintain the database of sites identified
316 under the KBA Standard (the World Database of Key Biodiversity Areas) was another issue raised by
317 end-users. The cost of KBA identification to date has been estimated at US\$100 million, with a little
318 less than US\$1 million now invested annually. It is estimated that US\$21 million is needed to deliver
319 global baseline KBA identification, and US\$2 million annually is necessary to maintain those data
320 once that baseline is reached (Juffe-Bignoli *et al.* 2016). Despite this obvious resource need, many of

321 our respondents requested that the data be freely available and accessible to all institutions and
322 sectors:

323
324 *"Cost is an important factor [...], and at least the basic data should be available for free to all*
325 *institutions and sectors."*

326
327 Private sector interviewee
328

329 End-users also discussed challenges related to securing funding and resources for KBA identification.
330 One end-user with national level KBA assessment experience stressed that considerable effort and
331 funds are required to undertake a KBA assessment. Given limited resources, the end-users pointed
332 out that the KBA approach should demonstrate clear added value and conservation outcomes to
333 justify expenditure on the identification of KBAs. Another declared their concerns about the IUCN's
334 capacity and the resourcing needed to coordinate the implementation and management of the KBA
335 Standard, following its launch. One end-user summarises these perspectives by stating:

336
337 *"...a consistent standard is needed but there are parallel needs for increased resources for*
338 *data collection and capacity building... [We need a] global KBA database which is free and*
339 *accessible online, and kept updated, with all documentation (e.g. what triggered each KBA,*
340 *process of delineation, any associated information)."*

341
342 Civil society questionnaire respondent
343

344 These perspectives on resource challenges resulted in the development of **Q9**: 'KBA data should be
345 freely available for commercial use'. The largest percentage of respondents agreed with the
346 statement (42%), but only slightly fewer disagreed (32%).

347
348 **3.5 Should KBAs be strictly protected?**

349 End-users commented on whether development should be allowed in KBAs or, conversely, if KBAs
350 should be strictly 'no go' for development during the end-user engagement process. 'No go' areas
351 for development are areas where human activities are limited, typically in protected areas and other
352 areas of importance for biodiversity. Some end-users expressed concerns that KBAs may become 'no
353 go' areas for development. The concept of permitting sustainable use in KBAs was also mentioned
354 by many. One private sector end-user was concerned:

355
356 *"That KBAs may become or are advertised as 'no go' areas for development. KBAs should*
357 *help to identify areas of high biodiversity importance that need to be safeguarded, but*
358 *should not be prescriptive of the management actions. Action plans can then be put in place*
359 *to ensure that [...] activities in or near KBAs are managed to avoid and minimise any*

Commented [RV3]: Suggest rephrase – this is unclear

potential impact. Otherwise, the KBA approach may be counterproductive, and may not get the support it needs from governments and other stakeholders.”

Private sector interviewee

This informed the development of **Q11**: ‘development activities should not be permitted in KBAs’. Only marginally more end-users agreed (38%) with this statement, than those who disagreed (34%).

The use of mixed methods therefore enabled us to determine and understand end-users’ needs and concerns in great depth and breadth. The high level of convergence in opinion for many of the topics provides a good level of corroboration and certainty for these findings and suggests that these are areas of broad consensus. We further explore and interpret the main areas of divergence in opinion here and reflect upon how they were considered and/or addressed during the development of the KBA Standard and through an evolving KBA governance structure.

4. Discussion

The end-user input was incorporated into the process of developing the KBA Standard and it also informed decisions related to the establishment of new KBA governance structures to support the implementation of the KBA Standard. This was done to ensure the usefulness and relevance of the resulting KBA Standard and associated data and demonstrates the pragmatic and applied nature of the end-user engagement process.

4.1 Addressing *divergent end-user opinions*

The difference between the answers to **Q5** and **Q6** (relative value of a global standard compared to varying national approaches) is informative as this suggests that approximately half of respondents who think that national processes may be undermined by KBA identification see this as a negative implication, whereas the other half as a positive implication. The implications of national level KBA identification was the subject of many exchanges that occurred during the wider global stakeholder engagement process and clarification and guidance was consequently integrated into the KBA Standard. The KBA Standard clarifies that although the KBA criteria are intended for the identification of KBAs meeting thresholds of global significance, the criteria can also be applied with less stringent thresholds to identify sites of national/regional significance (IUCN 2016a: 5). The KBA Partnership Agreement (KBA Partnership, 2016) includes further information about applying the KBA Standard at regional and national levels, and states that detailed guidance will be produced by the KBA Partnership in due course (the KBA Partnership is discussed further in **Section 4.2**).

Commented [RV4]: Suggest rephrase – the stakeholder views are divergent (on some topics), not the topics themselves

Commented [JM5]: IUCN colleagues: can we add any more detail here about the detailed guidance at this time?

396 The item on the prioritisation of KBAs over other areas (**Q8**) was intentionally silent on whether the
397 respondents believed that this was a good or a bad thing. It could be interpreted that the majority of
398 end-user respondents believed that an emphasis on KBAs could result in negative outcomes for
399 conservation, by limiting the diversity of conservation efforts and creating opportunities to perceive
400 anything outside KBAs as open for development and/or as not important for biodiversity.
401 Alternatively, it could be interpreted as a majority believe that a focus on KBAs could result in
402 positive outcomes for conservation by focusing conservation effort and scarce resources and by
403 directing development towards less important areas for biodiversity. That 91% of respondents
404 agreed that a standardised approach to KBA identification is needed (**Q1**) suggests the latter – that
405 most respondents see the focus of attention towards globally important sites and away from other
406 sites as an advantage of the KBA Standard. The KBA Standard contains two paragraphs discussing
407 caveats to this point (IUCN 2016: 2–3), acknowledging that areas outside of KBAs are not necessarily
408 of lesser importance because they may not have been identified as KBAs yet or may be important for
409 other reasons.

410
411 Whether or not KBA data should be made freely available for commercial use (**Q9**) presents a
412 tension between the need for immediate high quality data and ensuring it is freely available to all
413 end-users. The cost of identifying KBAs and developing, managing, and maintaining the World
414 Database of Key Biodiversity Areas is significant (Juffe-Bignoli *et al.*, 2016) and may compete with
415 other conservation expenditures. This resource challenge has been addressed in part through the
416 establishment of a KBA Partnership (discussed further in **Section 4.2**), comprising 12 international
417 conservation organisations. Each organisation in the partnership has committed a minimum of US\$1
418 million over 5 years to support the identification of KBAs. This helps to address some of the resource
419 challenges and also addresses concerns about IUCN’s capacity to coordinate the implementation of
420 the KBA Standard, and the management of KBAs, as this responsibility is now is shared through the
421 KBA Partnership. The KBA Partnership Agreement (KBA Partnership, 2016) also includes details on
422 terms and conditions of use (including copyright and ownership of the KBA data), a structure for
423 licensing data for commercial use through the Integrated Biodiversity Assessment Tool with different
424 access options for different end-uses (including IBAT for Business³), and a fundraising protocol.

425
426 Respondents were almost evenly split on whether or not development activities should be permitted
427 in KBAs (**Q11**). While some stressed the need to ensure that the implementation of the KBA
428 Standard would not result in strict prescriptive land-use restrictions, others viewed the KBA

³ <https://www.ibatforbusiness.org/>

Commented [JM6]: IUCN colleagues: can we say anything more definitive about the cost of / access to KBA data here?

For example IBAT pricing options?

429 approach as playing an important role in restricting development in, and around, important places
430 for biodiversity. This is not a new area of divergence in opinion. The debate between sustainable use
431 and strict protection has been on-going for decades (Adams, 2004), with the concept of sustainable
432 use (or 'sustainable utilisation') first appearing in the World Conservation Strategy (IUCN, 1980).

433
434 This area of divergence in end-user opinion contributed to the development of a subsequent project
435 led by IUCN's Global Business and Biodiversity Programme, referred to as 'Guiding Responsible
436 Business Operations in Key Biodiversity Areas'. The project developed guidelines for responsible
437 business operations in and around Key Biodiversity Areas (KBA Partnership, 2018⁴). The guidelines
438 build upon input provided by end-users during an end-user consultation workshop (July, 2016) and
439 input submitted during a public consultation process (December 2016 – March 2017). The
440 guidelines provide the recommended minimum requirements for business operations having direct,
441 indirect, and cumulative impacts on a KBA, unless the national or local law is more stringent, in
442 which case the law shall prevail.

443
444 This divergence was also reflected in the KBA Standard (IUCN 2016: 8) by stating that although the
445 identification of a KBA implies that a site should be managed to ensure the persistence of
446 biodiversity, KBA status has no bearing on a site's legal or protected status. Many KBAs are or will
447 become protected areas, but many will not be formally protected and will need to be safeguarded
448 through other management approaches (Butchart *et al.* 2012). The KBA Standard also states that
449 KBAs are not necessarily priorities for any particular conservation action. This is an area that the KBA
450 business guidelines described above attempt to clarify.

453 4.2 An evolving KBA governance structure

454 In conjunction with the finalisation of the KBA Standard in 2016, a KBA Partnership was established
455 (KBA Partnership, 2016) to map, monitor and safeguard KBAs. The KBA Partnership comprises 12
456 partners: BirdLife International, International Union for Conservation of Nature, Amphibian Survival
457 Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment
458 Facility, Global Wildlife Conservation, NatureServe, Rainforest Trust, Royal Society for the Protection
459 of Birds, World Wildlife Fund for Nature, and the Wildlife Conservation Society. Under the KBA
460 Partnership Agreement, a number of governance bodies were established: a KBA Committee (to
461 govern the implementation of the KBA Standard), a KBA Secretariat (to coordinate KBA activities and

Commented [RV7]: ...and how have the guidelines dealt with this issue?

Commented [JM8]: IUCN colleagues: can we say anything more specific about how the guidelines and the KBA Standard have dealt with this issue here. Shall we be explicit about the fact that KBAs are not 'no go' areas?

Shall we bring in a brief discussion about the WCC decisions 26, 33 and 64 here?

⁴ <http://www.keybiodiversityareas.org/business-guidelines>

462 manage KBA data), a KBA Community (to support and connect institutions identifying KBAs on the
463 ground and in the water), a KBA Standards and Appeals Committee (to develop and update
464 guidelines for the application of the KBA Standard and to adjudicate appeals), and, importantly in
465 light of this research, a KBA Consultative Forum (to convene feedback from end-users) (KBA
466 Partnership, 2016).

467 The purpose of the KBA Consultative Forum⁵ is to provide a mechanism to elicit on-going input and
468 feedback from a range of end-users on the use and application of the KBA Standard and to continue
469 to communicate their needs and concerns to the KBA Partnership. The KBA Consultative Forum
470 represents a continuation of the end-user engagement process and is an important component of
471 maintaining and supporting knowledge transfer and exchange with end-users. It also encourages
472 sustained dialogue, particularly on the topics that resulted in a divergence in opinion amongst end-
473 users.

474 *4.3 Good practice recommendations for future end-user engagement processes*

475 The end-user engagement process was informed by eight principles of good practice in international
476 standard setting (ISEAL, 2014) and five principles for effective knowledge exchange (Reed *et al.*
477 2014) (see **Supplementary Data C**). We have consolidated five good practice recommendations
478 (**Table 6**) that we consider to be important for future similar processes seeking to engage end-users.

Commented [RV9]: How do these compare to ISEAL 2014 and Reed et al. 2014 - ?

479

480

481

482

483

484 **Table 6.** Summary of good practice recommendations.

Recommendations	Description	Relevance to the KBA End-user Engagement Process
1 – Define, Categorise, and Identify	Define, categorise, and identify who end-users are early on in the process. Ideally this would be done in a participatory way with end-users and other stakeholders to clearly define the scope of the issue and identify all those with a stake or interest in it. Relates to ISEAL (2014) (Principles 2 and 3) and Reed <i>et al.</i> (2014) (Principle 2).	Early in the process (during the Framing Workshop (IUCN, 2012)), we defined, categorised, and identified end-users in a participatory way. We also co-developed a typology of end-users that is documented in the Framing Workshop Report (IUCN, 2012: 24-25). This helped to target specific end-user groups for the interviews and helped us to evaluate the representativeness of our questionnaire respondents (Table 2).

Commented [RV10]: How was this done – through the Framing Workshop? Specify.

⁵ <http://www.keybiodiversityareas.org/kba-partnership/kba-consultative-forum>

2 – Mixed Methods	Use a mixed methods approach to determine end-users' needs and concerns. Qualitative end-user interviews are useful for determining their main needs and concerns and for providing in depth understanding; however, these should be complemented and substantiated using additional methods, such as a questionnaire, with a larger group of end-users for an increased breadth of understanding.	We used mixed methods to determine end-users needs and concerns during the engagement process. This paper provides a detailed account of the results obtained through the use of mixed methods. This helped to identify the main areas of convergence and divergence in end-user opinion (Figure 1). It also helped us to explore these topics in great depth and breadth.
3 – Process Transparency	Design, document, and communicate a clear and transparent decision-making process for how end-user input will be integrated. Ensure that this process is openly communicated to end-users and feedback mechanisms are in place to evaluate the process and outcomes. It is important to systematically and transparently consider and address the input received and follow-up with end-users with decisions/results/outcomes as early as possible. Relates to ISEAL (Principles 4, 6, 7, and 8) and Reed <i>et al.</i> (2014) (Principle 4).	We documented end-user interviews in Dudley <i>et al.</i> (2014), including each interview report being reviewed and co-authored by the end-user interviewees themselves. End-user questionnaire details and results are provided in this paper (Figure 1). Further process transparency on decision-making processes would have clarified how we planned to use end-user input to inform the development of the KBA Standard. By evaluating our engagement process against existing good practice principles (ISEAL, 2014; Reed <i>et al.</i> 2014) we were able to reflect upon how we could have better communicated how we planned to use end-user input.
4 – Resources	The design and implementation of a meaningful end-user engagement process requires resources. Consider the financial and human resources that will be needed. Do not underestimate how long end-user engagement will take and be prepared to adapt the process based upon the available resources, context, and needs and concerns of end-users.	We reported on the time and resources required to engage end-users here in this paper (Section 2.3). This helped us to consider the efficiency and effectiveness of the approaches that we used and will help to inform the work of the KBA Consultative Forum and the design of future similar processes.
5 – On-going Engagement	Design and implement on-going end-user engagement processes and/or governance structures beyond the initial project where relevant and/or needed. Relates to Reed <i>et al.</i> (2014) (Principle 5).	Ongoing engagement with end-users is supported through the establishment of the KBA Consultative Forum (Section 4.1). This helped to enable on-going dialogue with end-users..

Commented [RV11]: Authored or reviewed?

Commented [RV12]: Not clear – this WASN'T done here, but you recommend it IS done in similar future exercises? Did not making this clear have any negative consequences here?

Commented [RV13]: Has this evaluation been done? It is not reported on here. How would you evaluate – against what expectations or baseline? Is there an alternative approach that could be used, the costs of which can be compared?

485

486 5. Conclusions

487 This end-user engagement process helped to advance our understanding of global scale
488 transdisciplinary knowledge production and use. The kind of user-oriented approach featured in this
489 process aligns closely to a trend towards increasingly transdisciplinary and accountable engagement
490 observed in a number of contexts around the world (Jolibert and Wesselink, 2012; Phillipson *et al.*
491 2012; Shove and Rip, 2000); however, it represents a novel approach for engaging end-users in the
492 context of global conservation standard setting. We have demonstrated how the use of a mixed
493 methods approach enabled us to determine, consider, and address end-users' needs and concerns
494 during the development of the KBA Standard.

495

496 The high level of convergence in end-user opinion for many of the topics suggests that these are
497 areas of broad consensus. In contrast, our focus on the main emergent topics of divergence helped
498 us to understand these diverse perspectives and incorporate them into the development of the KBA
499 Standard. The areas of divergence can be linked to concepts and debates that reach beyond the
500 context of KBAs. Challenges related to scale, cost, prioritisation, and development activities can be
501 found in many discussions about biodiversity conservation, land-use change, and resource
502 management (Adams, 2004; IUCN, 1980). These challenges also relate to differences in opinion
503 about where responsibility lies for natural resource management. These areas of divergence are the
504 topics that require ongoing consideration from the KBA Partnership and further dialogue through
505 the KBA Consultative Forum.

506

507 The knowledge needed to develop solutions to complex environmental problems is produced,
508 exchanged, and used in science, policy, and practice and in the interfaces between them (van den
509 Hove, 2007). Recognising the diversity of knowledge needed to address environmental challenges,
510 and the range of different perspectives relating to how these challenges should be addressed, are
511 both important if we are to encourage collaboration and build bridges among people operating
512 within different disciplines, sectors, and geographies (Gibbons *et al.*, 1994; Lövbrand, 2011;
513 Nowotny *et al.* 2003). The goal of this research was to learn through practice and to inform on-going
514 stakeholder engagement and governance mechanisms. Our sharing of good practice
515 recommendations helps to bridge the gap between the theories of knowledge production and the
516 practice of end-user engagement.

517

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Commented [RV14]: References? Some examples would be useful, also for the next sentence.

Commented [JM15]: Nigel – any references for this statement/sentence?

Commented [RV16]: Any references to provide further support to these general and sweeping statements?

528 Cambridge Conservation Initiative Collaborative Fund for Conservation, Environment Agency Abu
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533 Monitoring Centre (UNEP-WCMC).

534 **Supplementary Data**

535 A - End-user questionnaire.

536 B - Descriptive statistics.

537 C – Summative evaluation principles.

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Commented [JM17]: Jessica to double check reference format.
Add website links and DOIs, where appropriate.

Remove pp. for page number and no italics.

Example:

Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2010. The art of writing a scientific article. *J. Sci. Commun.* 163, 51–59.

Citation in text

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

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As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Reference formatting

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.

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741

742 Vitae

743 **Jessica Lynch Maxwell** is a Research Fellow at the James Hutton Institute. Her current research
744 investigates the relationship between placemaking, planning, and ecosystem services in order to
745 build capacity towards integrated land use planning. Jessica's former research focused on natural
746 resource management, land-use change, biodiversity conservation, and stakeholder engagement.
747 She has also worked on a variety of cross sector knowledge exchange projects in collaboration with
748 intergovernmental, private, and civil society organisations. Her PhD investigated the global
749 stakeholder engagement process that informed the development of the International Union for
750 Conservation of Nature's Key Biodiversity Area Standard.

751
752
753 **Nigel Dudley** is an environmental consultant, focusing primarily on issues relating to protected areas
754 and landscape approaches to conservation, particularly in forest ecosystems. Clients include NGOs,
755 UN agencies and governments around the world. He is chair of the IUCN World Commission on
756 Protected Areas specialist group on Natural Solutions, which addresses ecosystem services from
757 protected areas, and has been closely involved in the development of the KBA concept.

758

759 **Janet Fisher** works on XYZ

760

761 **Simon Allen** is a Lecturer in the School of GeoSciences at the University of Edinburgh. Originally
762 trained as a botanist and ecologist, he has developed broad interdisciplinary interests in sustainable
763 development, with a particular focus on the impacts and mitigation of climate change. Since 2000,
764 he has directed the MSc Environmental Sustainability programme.

765

766 **Genevieve Patenaude** works on XYZ

767

768 **Penny Langhammer** is Director of Key Biodiversity Areas for Global Wildlife Conservation and the
769 Amphibian Survival Alliance, where she supports local partners in identifying, monitoring and
770 safeguarding KBAs. She is Co-chair of the IUCN WCPA-SSC Joint Task Force on Biodiversity and
771 Protected Areas and was lead editor of *A Global Standard for the Identification of Key Biodiversity*
772 *Areas*. Her background is in conservation planning and priority-setting, conservation impact
773 assessment, and emerging infectious diseases of amphibians. Penny is Adjunct Professor in the
774 School of Life Sciences and a Research Affiliate with the Center for Biodiversity Outcomes at Arizona
775 State University.

776

777 **Stephen Woodley** is an ecologist and the first Chief Scientist for Parks Canada, where he worked on
778 a number of issues related to protected areas, including ecological monitoring, species at risk,
779 wildlife disease, ecological restoration, science policy and climate change. He currently is Vice Chair
780 for Science and Biodiversity of IUCN's World Commission on Protected Areas. The focus of the work
781 is to understand the role of protected areas as solutions to the current global conservation
782 challenges.

783

784 **Thomas Brooks** is Chief Scientist at the International Union for Conservation of Nature. His
785 responsibilities include scientific support to the delivery of knowledge products (such as the IUCN
786 Red List of Threatened Species), maintaining interactions with peer scientific institutions, and
787 strengthening the Union's culture of science. He holds a B.A. (Hons) in Geography (Cambridge
788 University) and a Ph.D. in Ecology and Evolutionary Biology (University of Tennessee). His
789 background is in threatened species conservation (especially of birds) and biodiversity hotspots (he
790 has extensive field experience in Asian, South American and African tropical forests). He has
791 authored 246 scientific and popular articles.

792

793

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795

796 **Supplementary data**

797

798 **A - End-user Questionnaire**

799 (made available in English, French and Spanish)

800

801 **Key Biodiversity Areas – End-User Questionnaire**

802

803 During the 2004 World Conservation Congress, IUCN Members requested that the IUCN “convene a
804 worldwide consultative process to agree a methodology to enable countries to identify Key
805 Biodiversity Areas” (WCC 3.013). Key Biodiversity Areas (KBAs) are sites contributing significantly to
806 the global persistence of biodiversity. A great deal of collaborative work and research has been
807 undertaken since that time, convened through the IUCN Species Survival Commission (SSC) and the
808 World Commission on Protected Areas (WCPA) Joint Task Force on Biodiversity and Protected Areas.
809

810 The aim of the consultation process is to develop a globally agreed standard for the identification of
811 KBAs, which draws and builds on existing approaches, while responding to end-users needs for a
812 scientifically rigorous yet pragmatic methodology. End-users are considered to be those involved in
813 decision-making processes linked to mechanisms to secure biodiversity or to avoid biodiversity loss.

814
815 The purpose of this end-user consultation is to seek opinions on how the information produced
816 through the application of the KBA Standard can:

- 817
818 - be used to inform policy and practice;
819 - best suit end-user needs; and
820 - result in the best outcomes for biodiversity.

821
822 This questionnaire is being conducted in association with the IUCN SSC/WCPA Joint Task Force on
823 Biodiversity and Protected Areas as part of research underway at the University of Edinburgh.
824 Further information on data protection and ethics can be found at the end of the questionnaire.

825
826 Your time and input are greatly appreciated.

827
828 *** Required**

829
830 Sector *

831

832

833
834 Institution/Organisation *

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838
839 Nationality *

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841

842
843 Country of employment *

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845

846 Interviews were selected from a wide range of sectors. The purpose of the interviews was to
847 determine their needs, data requirements, concerns and recommendations in relation to the
848 development of the KBA Standard. The interviews documented end-user perspectives and did not
849 seek unanimity.

850
851 The questions below seek to solicit broader input from existing and potential end-users on the main
852 themes that emerged from the interviews. In addition, the same five open-ended questions posed
853 during the interviews are also included at the end of the questionnaire for optional additional input.

854
855 **Please indicate your level of agreement/disagreement with each statement.**

856
857 A standardized approach to identify KBAs is needed.

- 858
859 ☐ Strongly Agree
860 ☐ Agree

- 861 ☐ Neither Agree nor Disagree
862 ☐ Disagree
863 ☐ Strongly Disagree
864

865 The KBA Standard should build upon the existing approaches used to identify sites of particular
866 importance for biodiversity (such as Important Bird and Biodiversity Areas, Important Plant Areas,
867 Alliance for Zero Extinction Sites and others).

- 868
869 ☐ Strongly Agree
870 ☐ Agree
871 ☐ Neither Agree nor Disagree
872 ☐ Disagree
873 ☐ Strongly Disagree
874
875

876 KBA data should be used to inform the prioritisation of conservation action.

- 877
878 ☐ Strongly Agree
879 ☐ Agree
880 ☐ Neither Agree nor Disagree
881 ☐ Disagree
882 ☐ Strongly Disagree
883

884 KBAs themselves should be priorities for conservation action.

- 885
886 ☐ Strongly Agree
887 ☐ Agree
888 ☐ Neither Agree nor Disagree
889 ☐ Disagree
890 ☐ Strongly Disagree
891
892
893
894

895 One global standardised approach for identifying KBAs is preferable to multiple national level
896 approaches that identify areas of particular importance for biodiversity.

- 897
898 ☐ Strongly Agree
899 ☐ Agree
900 ☐ Neither Agree nor Disagree
901 ☐ Disagree
902 ☐ Strongly Disagree
903

904 A focus on KBAs may undermine national processes and priorities.

- 905
906 ☐ Strongly Agree
907 ☐ Agree
908 ☐ Neither Agree nor Disagree
909 ☐ Disagree
910 ☐ Strongly Disagree
911

912 KBAs should be ranked according to relative importance for biodiversity.

- 913
914 ☐ Strongly Agree
915 ☐ Agree
916 ☐ Neither Agree nor Disagree
917 ☐ Disagree
918 ☐ Strongly Disagree

919
920 An emphasis on KBAs could hinder conservation efforts outside of KBAs.

- 921
922 ☐ Strongly Agree
923 ☐ Agree
924 ☐ Neither Agree nor Disagree
925 ☐ Disagree
926 ☐ Strongly Disagree

927
928 KBA data should be freely available for commercial use.

- 929
930 ☐ Strongly Agree
931 ☐ Agree
932 ☐ Neither Agree nor Disagree
933 ☐ Disagree
934 ☐ Strongly Disagree

935
936 A lack of biodiversity data in many regions could limit the utility of the KBA Standard.

- 937
938 ☐ Strongly Agree
939 ☐ Agree
940 ☐ Neither Agree nor Disagree
941 ☐ Disagree
942 ☐ Strongly Disagree

943
944
945
946 Development activities should not be permitted in KBAs.

- 947
948 ☐ Strongly Agree
949 ☐ Agree
950 ☐ Neither Agree nor Disagree
951 ☐ Disagree
952 ☐ Strongly Disagree

953
954 An initial KBA database, based on currently available data, should be developed quickly in order to
955 be immediately useful.

- 956
957 ☐ Strongly Agree
958 ☐ Agree
959 ☐ Neither Agree nor Disagree
960 ☐ Disagree
961 ☐ Strongly Disagree

962

963 KBA documentation should include management options for the site.

- 964
965 ☐ Strongly Agree
966 ☐ Agree
967 ☐ Neither Agree nor Disagree
968 ☐ Disagree
969 ☐ Strongly Disagree

970
971 KBA documentation should include additional information when available (such as information on
972 climate change impacts, ecosystem services and socio-economic data).

- 973
974 ☐ Strongly Agree
975 ☐ Agree
976 ☐ Neither Agree nor Disagree
977 ☐ Disagree
978 ☐ Strongly Disagree

979
980 Thoughtful engagement at the local level will be essential to the effective application of the KBA
981 standard.

- 982
983 ☐ Strongly Agree
984 ☐ Agree
985 ☐ Neither Agree nor Disagree
986 ☐ Disagree
987 ☐ Strongly Disagree

988
989 Clear communication regarding the added value of the KBA standard is needed.

- 990
991 ☐ Strongly Agree
992 ☐ Agree
993 ☐ Neither Agree nor Disagree
994 ☐ Disagree
995 ☐ Strongly Disagree

996 The KBA Standard will encourage collaboration among constituencies involved in identifying sites of
997 particular importance for biodiversity.

- 998
999 ☐ Strongly Agree
1000 ☐ Agree
1001 ☐ Neither Agree nor Disagree
1002 ☐ Disagree
1003 ☐ Strongly Disagree

1004
1005 Any additional comments or questions?

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1007
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1011 **Open Ended End-User Interview Questions (optional)**

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1013 What do you need from KBAs?

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What tools and products do you require?

How do KBAs fit with your existing and emerging policies and procedures?

Do you have any concerns about the application of the KBA Standard? If so, what are they?

What are the main recommendations you have, based on your answers above, for the development of the KBA Standard?

Would you be willing to answer some follow up questions in relation to the KBA Standard?

If yes, please provide your name and email below.

- ☐ Yes
- ☐ No

Name:

Email:

1065 **Data Protection and Ethics**

1066
1067 All information provided by respondents will be processed and stored electronically in an encrypted
1068 format in accordance with the UK Data Protection Act (1998) and the University of Edinburgh's Data
1069 Protection policy. This information will be used to inform the ongoing KBA consultation process and
1070 for academic research purposes. The data will not be shared. All efforts will be made to maintain
1071 confidentiality and anonymity.

1072
1073 Please note that by participating in this questionnaire you have indicated your acceptance of the
1074 data protection terms and conditions indicated above.

1075
1076 If you have any further questions or if you are interested in receiving a copy of the final
1077 publication(s) please let Jessica Boucher know (jessica.boucher@ed.ac.uk).

1078
1079 Further information regarding the IUCN SSC/WCPA Joint Task Force on Biodiversity and Protected
1080 Areas can be found at the following link:

1081
1082 [http://www.iucn.org/about/work/programmes/gpap_home/gpap_biodiversity/gpap_wcpabiodiv/gp](http://www.iucn.org/about/work/programmes/gpap_home/gpap_biodiversity/gpap_wcpabiodiv/gpap_pabiodiv/key_biodiversity_areas/)
1083 [ap_pabiodiv/key_biodiversity_areas/](http://www.iucn.org/about/work/programmes/gpap_home/gpap_biodiversity/gpap_wcpabiodiv/gpap_pabiodiv/key_biodiversity_areas/)

1084
1085 ***Thank you for your time and input.***
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1097 **B - Descriptive statistics**

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1099 **Table 7** lists the questionnaire statements in the same order as **Figure 1** (i.e. from those resulting in
1100 the highest level of convergence (top) towards increasing divergence (bottom)) and includes the
1101 mode, median, and interquartile-range (IQR) for all statements.

1102

1103 **Table 7.** Responses to the Likert statements (including mode (Mo), median (Md), and inter-quartile range
1104 (IQR)) ordered from highest level of convergence (top) towards increasing divergence (bottom) (Strongly Agree
1105 = 5, Agree = 4, Neither Agree nor Disagree = 3, Disagree = 2, Strongly Disagree = 1). Higher IQR values in bold =
1106 more divergent opinions.

#	Question	Mo	Md	IQR
Q16	Clear communication regarding the added value of the KBA Standard is needed.	5	5	1
Q15	Thoughtful engagement at the local level will be essential to the effective application of the KBA Standard.	5	5	1
Q3	KBA data should be used to inform the prioritisation of conservation action.	5	5	1

Q14	KBA documentation should include additional information when available (such as information on climate change impacts, ecosystem services and socio-economic data).	5	5	1
Q1	A standardised approach to identify KBAs is needed.	5	5	1
Q12	An initial KBA database, based on currently available data, should be developed quickly in order to be immediately useful.	5	5	1
Q2	The KBA Standard should build upon the existing approaches used to identify sites of particular importance for biodiversity (such as Important Bird and Biodiversity Areas, Important Plant Areas, Alliance for Zero Extinction Sites and others).	5	4	1
Q13	KBA documentation should include management options for the site.	5	4	1
Q4	KBAs themselves should be priorities for conservation action.	5	4	1
Q17	The KBA Standard will encourage collaboration among constituencies involved in identifying sites of particular importance for biodiversity.	4	4	1
Q10	A lack of biodiversity data in many regions could limit the utility of the KBA Standard.	4	4	1
Q7	KBAs should be ranked according to relative importance for biodiversity.	4	4	1
Q5	One global standardised approach for identifying KBAs is preferable to multiple national level approaches that identify areas of particular importance for biodiversity.	4	4	2
Q8	An emphasis on KBAs could hinder conservation efforts outside of KBAs.	4	4	2
Q9	KBA data should be freely available for commercial use.	3	3	2
Q11	Development activities should not be permitted in KBAs.	2	3	2
Q6	A focus on KBAs may undermine national processes and priorities.	2	3	2

C – Summative evaluation principles

The end-user engagement process was informed by principles of good practice in international standard setting (ISEAL, 2014). We undertook a summative evaluation of our end-user engagement process using eight of the most relevant ISEAL principles, which we grouped into three categories: (i) stakeholder identification; (ii) stakeholder engagement; and (iii) process transparency.

Stakeholder identification

- **Principle 1.** “At the outset of a standards development or revision process, the standard-setting organisation shall develop or update lists of sectors that have an interest in the standard and key stakeholder groups within those sectors, based on the standard’s scope and its social, environmental and economic outcomes [...] Scope includes the sector and geographies to which the standard applies.” ISEAL (2014: 12 – Clause 5.2)
- **Principle 2.** “The standard-setting organisation shall: a. seek to achieve representative participation in its standard-setting activities; and b. to this end, set participation goals for interest sector engagement that can be evaluated and updated over time.” ISEAL (2014: 12 – Clause 5.2 – Aspirational Good Practice)

- **Principle 3.** “The standard-setting organisation shall: a. identify stakeholder groups that are not adequately represented; and b. proactively seek their contributions. This shall include addressing constraints faced by disadvantaged stakeholders.” ISEAL (2014: 13 – Clause 5.4–4)

Stakeholder engagement

- **Principle 4.** “The standard-setter proactively engages with stakeholder groups that are likely to have an interest in the standard or that are likely to be affected by its implementation, and provides them with mechanisms for participation that are appropriate and accessible. Stakeholders feel that their views are represented in the consultation process and in decision-making.” ISEAL (2014: 9 – Credibility Principle 5)
- **Principle 5.** “The standard-setting organisation shall ensure that participation in the consultation process: a. is open to all stakeholders; and b. aims to achieve a balance of interests⁶ in the subject matter and in the geographic scope to which the standard applies.” ISEAL (2014: 13 – Clause 5.4)

Process transparency

- **Principle 6.** “The standard and information about its development are made freely and publicly available at a minimum via an organisation’s website. This includes, at least, draft and final versions of the standard, information on governance (how decisions are made and by whom, and how to participate in decision-making and standards development), and information on consultation (stakeholder input and how it was addressed in standards development).” ISEAL (2014: 9 – Credibility Principle 7)
- **Principle 7.** “The standard-setting organisation shall: a. compile all comments received during a consultation period; b. prepare a written synopsis of how each material issue has been addressed in the standard revision; c. make the synopsis publicly available; and d. send it to all parties that submitted comments.” ISEAL (2014: 13 – Clause 5.4–5)
- **Principle 8.** “The standard-setting organisation shall make original comments received during a consultation period publicly available⁷.” ISEAL (2014: 14 – Clause 5.4–6 – Aspirational Good Practice)

The end-user engagement process was also informed by five principles for effective knowledge exchange (Reed *et al.* 2014).

Principle 1 – Design: Know what you want to achieve with your knowledge exchange (goals) and design a flexible knowledge exchange strategy that can respond to changing user needs and priorities.

Principle 2 – Represent: Systematically identify your likely users, represent and embed their knowledge needs and priorities into your research and consider ethical implications of engaging with different stakeholders.

Principle 3 – Engage: Build long-term trusting relationships based on two-way dialogue with users, understand what motivates users, work with them to produce new knowledge and interpret the implications of your joint efforts for policy and practice.

⁶ A balance of interests in stakeholder participation cannot be ensured but the standard-setting organisation should make efforts to engage all those stakeholder groups identified in the stakeholder identification process.

⁷ Original comments that are made publicly available can be attributed to the stakeholder group but should not be attributed to individual stakeholders unless those stakeholders have consented to be identified.

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Principle 4 – Impact: Focus on delivering tangible results to as many users as possible and as early as possible.

Principle 5 - Reflect and Sustain: Monitor and reflect on your knowledge exchange work and its effectiveness regularly, use this to learn from and refine your knowledge exchange practice, share good practice and consider how to sustain a legacy of knowledge exchange beyond project funding.